

EM433 Computer-Aided Manufacturing Manufacturing Projects

One of the course objectives is for each student to complete a manufacturing project in which they will actually produce a useful component. You will work in groups of three per project. A smaller group may be acceptable depending on the size and complexity of the project. Each component will be an assembly of several parts which must fit together accurately for the component to perform its intended function. You are free to suggest a manufacturing project; however, keep in mind that you must allow sufficient time for your parts to be machined in TSD. This severely limits the amount of time that you have available to design a project from scratch. Several suggested projects are attached. For these projects, sketches or I-DEAS models of each part are available, or a sample object is available to form the basis for your design. The component must be amenable to manufacturing using the equipment in TSD, specifically, three-axis CNC mills and a CNC lathe. Other auxiliary equipment may be used for certain portions of the fabrication. Since the emphasis of this course is CAM, the bulk of the project should utilize the CNC equipment. You are highly encouraged to work with the machinists in TSD to perform any manual machining operations yourself.

You will be required to complete the following tasks for your project:

1. Fully document the specifications of each part of your component using I-DEAS. This will include properly dimensioned drawings, including tolerances, for each part of the assembly, assembly drawings, a bill of materials and a cost estimate.
2. Develop process plans for manufacturing each part of your component.
3. Use rapid prototyping to make a prototype of one or more of your parts.
4. Use your process plan to develop the NC toolpaths necessary to machine each part.
5. Produce a complete work request package for TSD to manufacture your parts. You will have to work with TSD personnel to verify that your documentation is complete and that the toolpaths and cutting parameters are correct before any actual machining takes place.
5. Work with TSD to machine your parts.
6. Document the processes used to manufacture the components, including photos of the actual processes.
7. Prepare a final report that documents the manufacturing plan and requirements for your component.

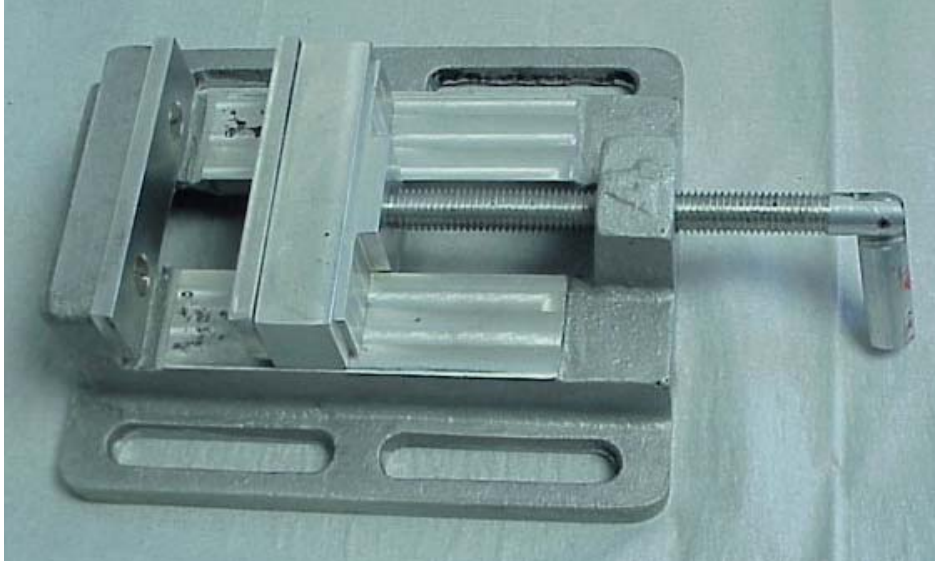
Suggested Projects:

1. Machinists Bench Vise (No drawing available, See Prof. Link for a representative vise)
2. Quick-acting Hold-Down Clamp
3. Dual-Acting Air Cylinder
4. Geneva Mechanism
5. Kant-Twist Clamp

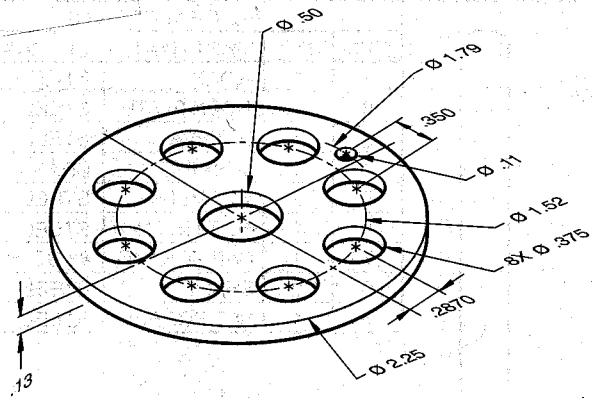
Due dates on next page.

Important Dates for Manufacturing Project Submittals:

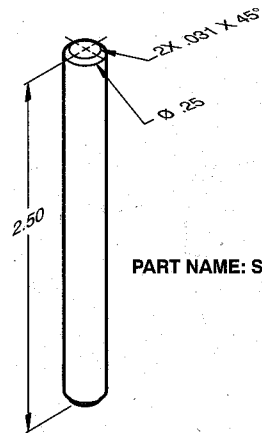
02 APR 04 All work requests submitted to TSD for manufacturing of parts.
28 APR 04 Final reports due.



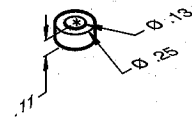
Bench vise



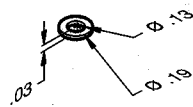
PART NAME: INDEX PLATE



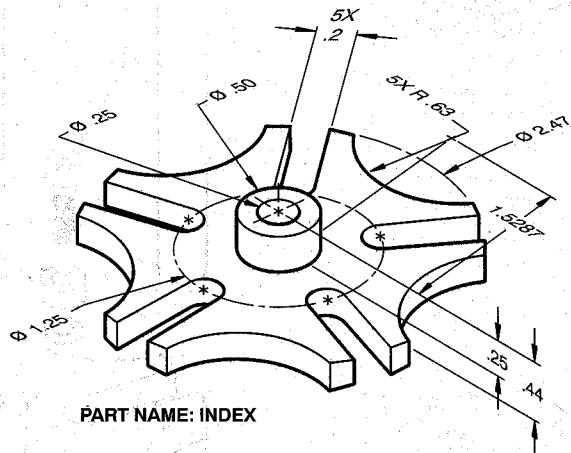
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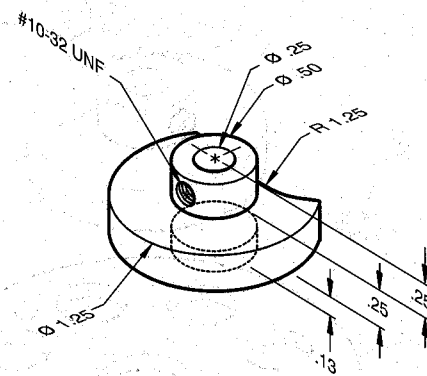
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PART NAME: WASHER

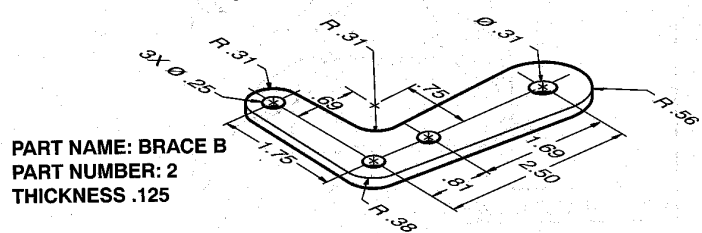
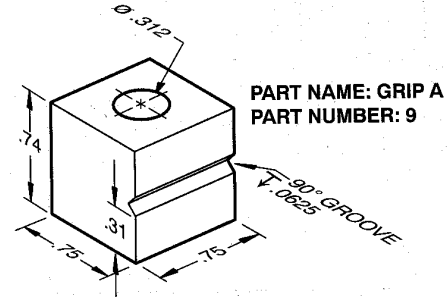
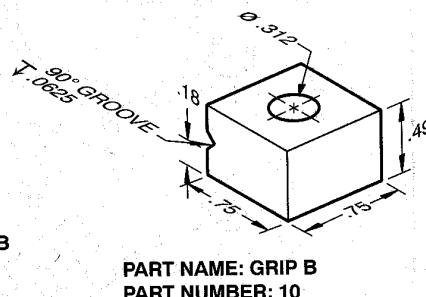
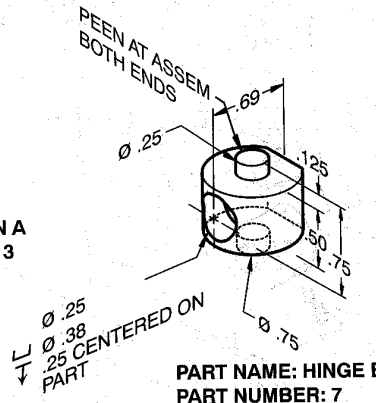
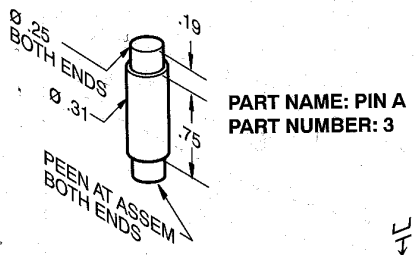
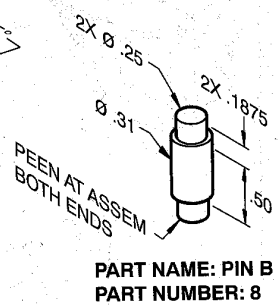
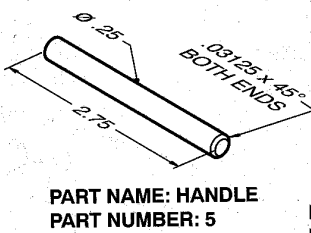
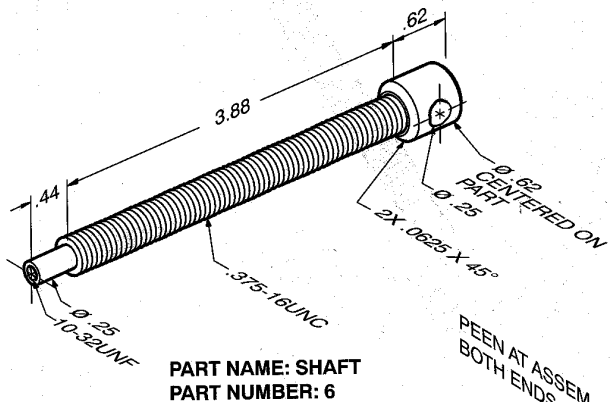
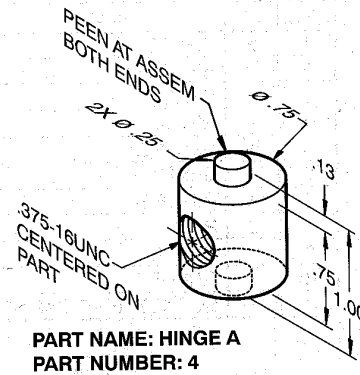
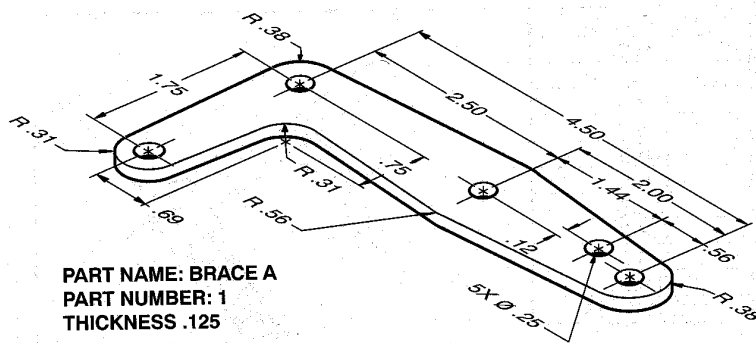


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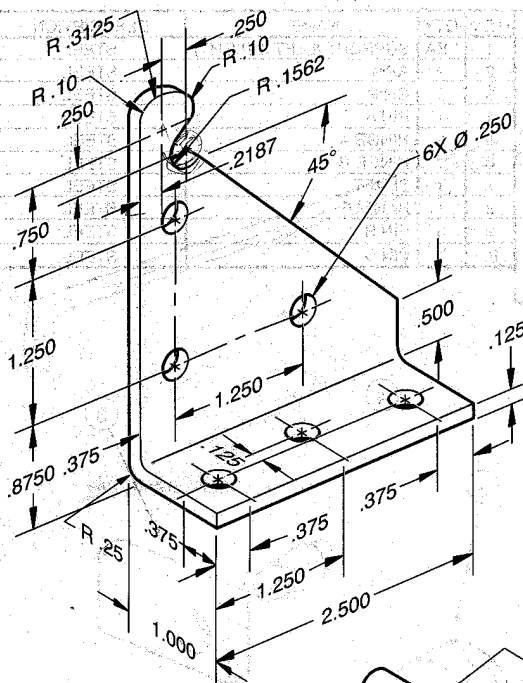


PART NAME: GENEVA

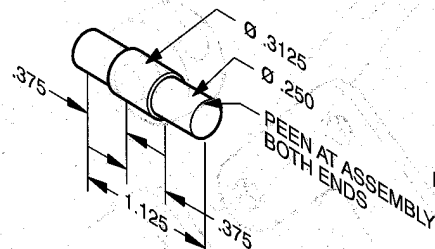
Geneva Mechanism



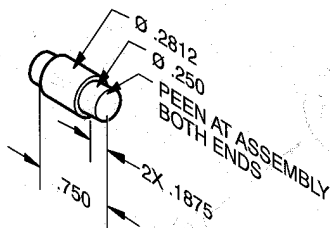
Kant-twist Clamp



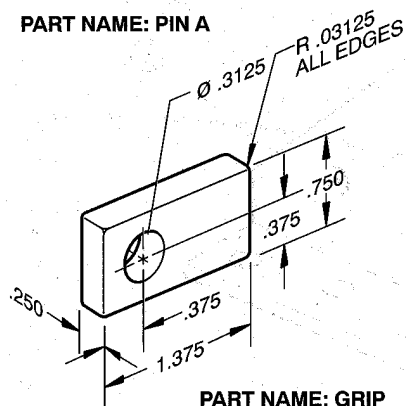
**PART NAME: SUPPORT
RIGHT & LEFT NEEDED**



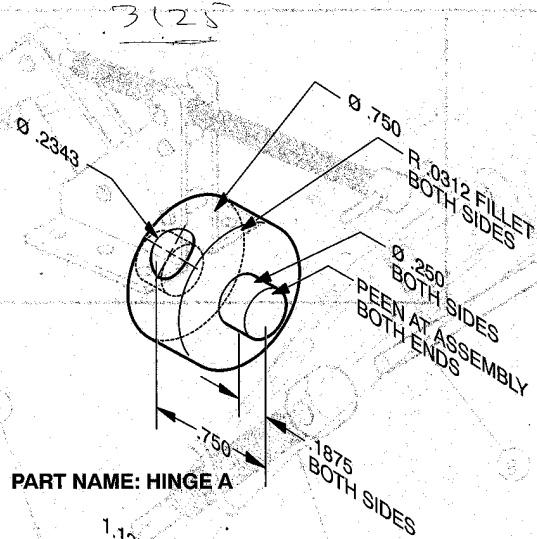
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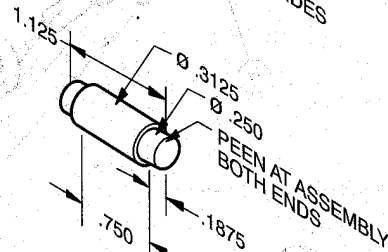
PART NAME: PIN A



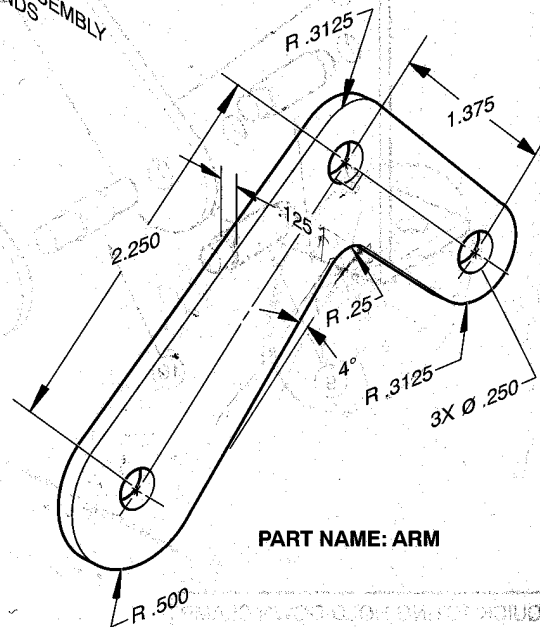
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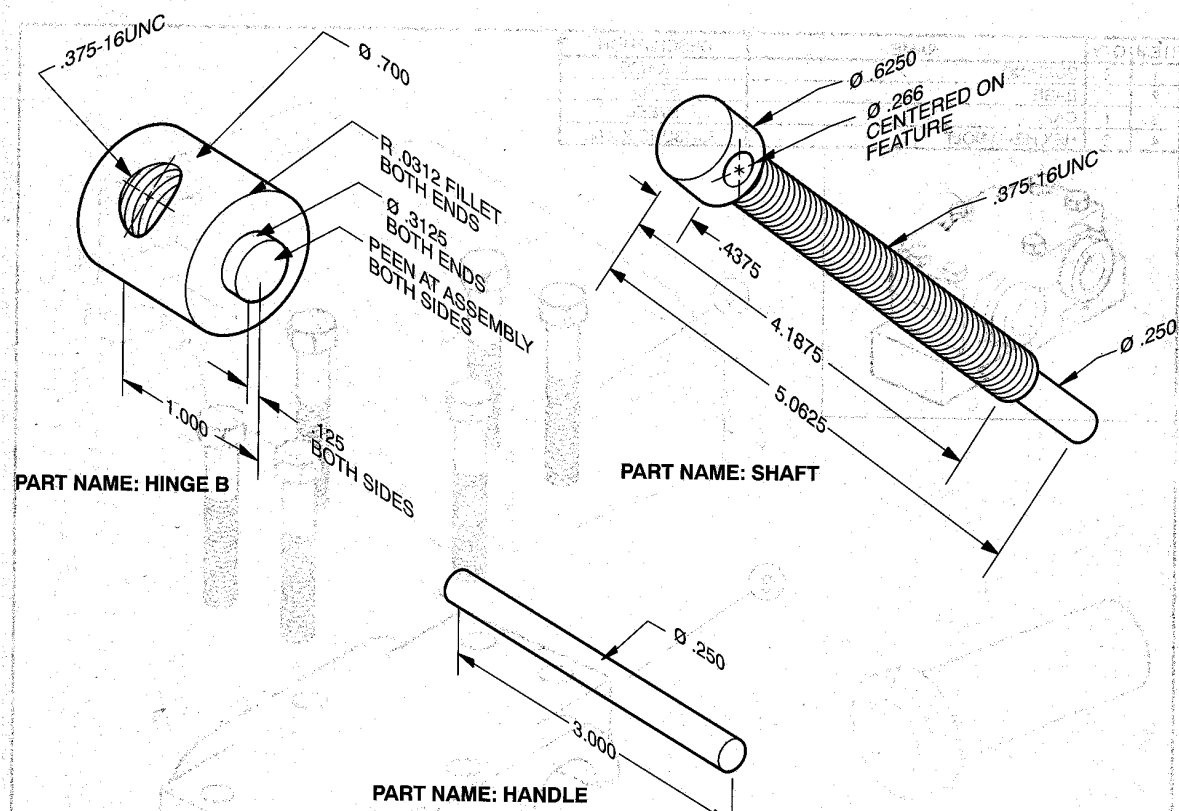
PART NAME: HINGE A



PART NAME: PIN B



PART NAME: ARM



Quick release hold-down clamp